

TESTING FOR LEAD IN DRINKING WATER OF SCHOOLS AND CHILD CARE FACILITIES - QUALITY ASSURANCE PROJECT PLAN (QAPP)

(October 1, 2019 – September 30, 2022)

Nebraska Department of Health and Human Services/
Nebraska Department of Environment and Energy
Drinking Water Division
1200 N St. Suite 400
PO Box 98922
Lincoln, Nebraska 68509-8922

Quality Assurance Project Plan

Project Name: Testing for Lead in Drinking Water of Schools and Child Care Facilities
Responsible Agency: Nebraska Department of Health and Human Services/Nebraska
Department of Environment and Energy
Division: Division of Drinking Water

APPROVAL

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Attachment A – 3Ts for Reducing Lead in Drinking Water in Schools and Child Care Facilities

Attachment B – 2014 Nebraska Public Health Environmental Laboratory (NPHEL) QAP

Attachment C – Nebraska 2018 Public Water System Supervision Program (PWSS) QAPP

Attachment D – Project Organizational Chart

Attachment E – List of Local Health Department Districts and Contact Information

Attachment F – Proposed Project Timeline

Attachment G – NPHEL SOP # 2800.2A EPA Method 200.8

Attachment H – Summarized Pb Data Flow Scheme

Attachment I – Sample Collection Instructions and Sample Submission Form

A3 Distribution List

1. Janell Miller, Drinking Water Division (DW) Administrative Assistant - Original for filing
2. Sue Dempsey, Drinking Water Division (DW) Administrator
3. Chin Chew, DW Engineering Services (ES) Program Manager
4. Justin Nelsen, DW Monitoring and Compliance (M&C) Program Manager
5. Andy Kahle, Project QA Manager/Field Services and Training (FS&T) Program Manager
6. Laurie Wieting, NPHEL Quality Assurance Manager
7. Ken Deason, U.S. EPA Project Officer
8. Diane Harris, U.S. EPA Quality Assurance Manager
9. Mary Boden, NPHEL Manager
10. Sam Capps, NDEE QAPP Manager

Project Management

A4 Project/Task Organization

1. Purpose

United State Environmental Protection Agency (U.S. EPA) policies require all U.S. EPA supported monitoring projects to develop and implement a Quality Assurance Project Plan to describe measures taken within the project tasks to ensure validity and defensibility of all environmental data generated for their use. This document is intended to fulfill that purpose.

The overall objective for this QAPP is to determine the lead concentration at water outlets used for drinking and food preparation within schools and child care facilities so potential corrective action(s) may be identified for those outlets sampled and found to exceed the U.S. EPA drinking water lead action level of 15 micrograms per liter ($\mu\text{g/L}$). To accomplish the objective, schools and child care facilities voluntarily participating in this project are prioritized by most at risk to lead in drinking water. The lead sampling will consist of the collection of a first draw (initial) sample at those outlets according to this QAPP. If a first draw (initial) from an outlet is found to contain lead at a concentration greater than 15 $\mu\text{g/L}$, local health department staff will work with the school or day care facility to identify corrective actions to minimize exposure to lead in drinking water. Activities conducted by this project are in accordance with *3Ts for Reducing Lead in Drinking Water in Schools and Child Care Facilities* which is included as Attachment A to this document.

2. Roles and Responsibilities

On July 18, 2017 the Nebraska Department Health and Human Services (DHHS) and the Nebraska Department of Environmental Quality (NDEQ) entered into a Memorandum of Agreement (MOA), with the purpose of enhancing the protection of public health and the environment through improved customer service, and increased efficiency. On July 1, 2019, merger of the Nebraska Department of Energy with NDEQ resulted in an Agency name change to Nebraska Department of Environment and Energy (NDEE). Drinking Water division staff will administer the Testing for Lead in Schools and Child Care Facilities Project under the supervision of NDEE.

Responsibility for day-to-day project activities, such as consultation with clients for appropriate sample site selection, sample collection management, sample results interpretation and health effects, rests with the local health departments. This Quality Assurance Project Plan (QAPP) is a written description of activities to be followed by Drinking Water Division and its project partners, the local health departments, to produce data of known and acceptable precision and accuracy to meet the goals of this project. The plan consists of this document, as well as standard operating procedures, which Division management approves. Standard operating procedures insure proper utilization of laboratory-generated data and other processes and procedures are followed.

The Nebraska Public Health Environmental Laboratory (NPHEL) is responsible for the processes and procedures to assure production of scientifically valid and defensible data. The specific laboratory standard operating procedures and the current NPHEL Quality

Assurance Plan (QAP) are included as Attachment B to this document. They are also available for viewing at the NPHEL located at 3701 South 14th Street, Lincoln, Nebraska. The NPHEL performs all water sample analysis for this project.

The term “license” or “licensed” is used in this document to describe a water operator with proper credentials to operate a public water system.

Administratively, the chain-of-command from top down for the implementation of this QAPP is as follows:

- a. NDEE Director – Jim Macy
- b. NDEE Deputy Director for Water – Steve Goans
- c. Drinking Water Division Administrator – Sue Dempsey
- d. NDEE Quality Assurance Project Plan Manager – Sam Capps

The first two positions listed above are primarily organizational and/or advisory in nature and are not described in great detail in this QAPP.

The project task organization also necessarily includes the employees of schools and child care facilities included in the prioritized sample pool which are classified as Public Water Systems (PWS). Those in the sample pool classified as a PWS have a licensed water operator with basic experience in the collection of water samples.

This section describes the qualifications and responsibilities for the primary positions associated with this project.

- a. NDEE Director
Directs and carries full responsibility for all activities, policies and decisions of NDEE.
- b. NDEE Deputy Director for Water (reports directly to the NDEE Director)
Responsible for the activities of the Water Division of NDEE, which through the MOA with DHHS, includes the Drinking Water Division.
- c. DW Administrator (Project Manager)
The DW Administrator is responsible for the overall management, implementation and administration of the project to ensure that all project activities are properly performed and project goals are met. The DW Administrator assigns personnel to tasks associated with this project, based on the relationship between current DW program responsibilities and the assigned project tasks. Those responsibilities are described in Section A4 of the Nebraska 2018 Public Water Supply Supervision Program (PWSS) QAPP, included as Attachment C to this document.
- d. NDEE QAPP Manager
Responsibilities are review and approval of the QAPP and any QAPP revisions, updates, or deviations, and coordinating any QA concerns with the PWSS QAPP Manager and/or Project Manager.
- e. NDEE and DHHS Public Information Offices (PIO)
The PIO is responsible for distribution of public information associated with this project via NDEE and DHHS Agency websites and providing media updates.

- f. DW Division Staff – Staff within Monitoring and Compliance (M&C) and Field Services and Training (FS&T) Sections (personnel identified below in Sections A.4.2.f through A4.2.1).
 - i. The tasks performed by the Drinking Water Division Administrator and assigned DW personnel associated with this project consists of:
 - 1. Developing a sample collection protocol video and Power Point for training of school and child care facility staff participating in the water sample collection tasks for this project.
 - 2. Coordinating sample kit requests with NPHEL.
 - 3. Coordinate with PIO in development of outreach / educational materials for local health departments, schools, child care facilities and the public.
 - 4. Coordinate with the local health departments, PIO and additional partners representing schools, local government and other community partners, for distribution of the outreach/educational materials.
 - 5. Periodic review of generated data, and generation of quarterly, annual and final project reports.
 - 6. Develop a system for the prioritizing of schools, and child care facilities to target those populations vulnerable to lead in the drinking water.
- g. Monitoring & Compliance (M&C) Program Manager (reports directly to the DW Administrator). Responsibilities described in 2d of Section A4 in the 2018 PWSS QAPP, included as Attachment C to this document.
- h. Information Systems Analyst (reports directly to M&C Program Manager). Responsibilities described in 2e of Section A4 in the 2018 PWSS QAPP, included as Attachment C to this document.
- i. Drinking Water Program Specialists (reports directly to M&C Program Manager) Responsibilities described in 2f of Section A4 in the 2018 PWSS QAPP, included as Attachment C to this document.
- j. Project QA Manager/FS&T Program Manager (reports directly to the DW Administrator). Responsibilities are ensuring that all QA elements are accounted for and are consistent with other QA documents, provide technical input on proposed sampling design, analytical methodologies, data review and maintaining the official, approved QA Project Plan. FS&T responsibilities are described in 2h of Section A4 in the 2018 PWSS QAPP, included as Attachment C to this document.
- k. Water Supply Specialists (report directly to FS&T Program Manager). Responsibilities described in 2i of Section A4 in the 2018 PWSS QAPP, included as Attachment C to this document.
- l. Environmental Quality Program Specialist/Operator Training and Licensure Coordinator (reports directly to the FS&T Program Manager). Responsibilities described in 2j of Section A4 in the 2018 PWSS QAPP, included as Attachment C to this document.

- m. Environmental Assistance Coordinator (reports directly to the FS&T Program Manager). Responsibilities described in 2k of Section A4 in the 2018 PWSS QAPP, included as Attachment C to this document.
- n. NPHEL Quality Assurance Manager
The NPHEL Quality Assurance Manager is responsible for reviewing the QAPP and resolving any NPHEL related QA issues that may arise during the project. Responsibilities are described in Section 2.3 of the NPHEL QAP, included as Attachment B to this document.
- o. NPHEL Manager
The NPHEL Manager has technical and administrative responsibility for the lab and its operation. This includes oversight of all QA requirements in the laboratory, data review, qualification of the data, development of a protocol for sample kit requests, ordering sample kit supplies, analysis, and electronic reporting of analysis results. Responsibilities are described in Section 2.4 of the NPHEL QAP, included as Attachment B to this document.
- p. Local Health Departments – (Local Project Coordinators)
Local health departments, within their respective districts, provide local coordination and assistance to the participating schools and child care facilities in the sampling pool. These activities include encouraging participation from qualifying schools and child care facilities, water sample site selection and collection, disseminating outreach/educational materials, identify lead sources and potential corrective actions for those sources, and act as a point of contact between the participating facilities and DW Division regarding the project activities within their respective local health department districts.
- q. Sample Collector or Sample Collection Team
The Sample Collector or Sample Collection Team, whether affiliated with the school district, child care facility, local health department, and/or contractors, is responsible for ensuring that field activities are conducted in accordance with this QAPP and the school or facility sampling plan.

The organizational structure for this project is included as Attachment D to this document.

3. Principal Data Users

- a. The principal data users are as follows.
 - i. The personnel who work in the M&C Program of DW, including the Drinking Water Program Specialists, Information Systems Analyst, and the Program Manager. M&C Program personnel review lead analytical results from the sample pool for these primary purposes.
 1. To determine if any project sample results exceed the U.S. EPA drinking water lead action level of 15 µg/L.
 2. To assure qualified sample collection sites are used
 3. To generate reports summarizing data as requested for DW program components, or as required of this project;
 4. To check for data errors, omissions or results that are suspicious because of the history.

- ii. Owners and operators of schools and child care facilities in the sample pool use the lead analytical results from their individual drinking water outlets for several purposes including:
 - 1. To determine which, if any, individual drinking water outlets exceed the U.S. EPA drinking water lead action level of 15 µg/L;
 - 2. To determine any remediation or corrective actions; and
 - 3. To prepare reports for parents, governing boards, and general public regarding the quality of the drinking water.
- iii. Local health departments use lead analytical results for purposes including:
 - 1. To assist staff at schools and child care facilities in identification of, and corrective actions for drinking water outlets where sample results exceed the U.S. EPA drinking water lead action level of 15 µg/L.
 - 2. To support public health initiative decisions.

A list of Nebraska local health department and counties within their designated districts is included as Attachment E to this document.

4. Secondary Data Users

- a. The secondary data users are as follows:
 - i. The Nebraska Department of Environment and Energy and Nebraska Department of Health and Human Services for ancillary activities associated with public health monitoring and reporting purposes.
 - ii. Nebraska Department of Education to institute potential investigatory and/or preventive measures in owned and regulated facilities.
 - iii. Rural Water Association, Midwest Assistance Program, League of Nebraska Municipalities, Central Community College and the Nebraska Section American Water Works Association for activities associated with PWS infrastructure improvements.

A5 Problem Definition/Background

1. Background

Lead is a toxic metal that can be harmful to human health when ingested. Young children, infants, and fetuses are particularly vulnerable to lead because the physical and behavioral effects of lead occur at lower exposure levels in children than in adults. In children, low levels of exposure have been linked to damage of the central and peripheral nervous systems, learning disabilities, shorter stature, impaired hearing, and impaired formation and function of blood cells. Lead can enter drinking water when the water quality characteristics create an aggressive water that may corrode pipes and fixtures containing lead. The most common sources of lead in drinking water are lead pipes, faucets, and fixtures. In schools and child care facilities with lead services lines, these pipes are typically the most significant source of lead in the water. Common sources of lead in drinking water include: solder, fluxes, pipes and pipe fittings, and plumbing fixtures.

The Lead Contamination and Control Act (LCCA) was established under the federal Safe Drinking Water Act in 1988 to reduce lead in the drinking water of schools and childcare

facilities. Requirements of the Act includes identification of water coolers that are not lead-free, repair or removal of water coolers with lead-lined tanks, and directed U.S. EPA to publish guidance to assist schools and child care facilities in identifying sources of lead in schools and taking actions to reduce lead contamination. U.S. EPA has prepared several guidance documents to assist schools in meeting the requirements of the Lead Contamination and Control Act (LCCA): *Lead in Drinking Water in Schools and Non-Residential Buildings* (EPA 812-B-94-002), and *Sampling for Lead in Drinking Water in Nursery Schools and Day Care Facilities* (EPA 812-B-94-003). In December 2005, amended October 2006, EPA issued a revised technical guidance document *3Ts for Reducing Lead in Drinking Water in Schools* (EPA 816-B-05-008) which replaced the *Lead in Drinking Water in Schools and Non-Residential Buildings* (EPA 812-B-94-002). The 3Ts Technical Guidance document was revised once again in October 2018, and is meant to assist school officials in implementing programs and policies to reduce children's exposure to lead in drinking water in schools. The document *3Ts for Reducing Lead in Drinking Water in Schools and Child Care Facilities* is included as Attachment A to this document.

2. Decisions to Be Made

Data obtained from this project will be used to assist schools and child care facilities in making decisions to initiate corrective actions to reduce lead exposure from water outlets used for drinking and food preparation that exceed 15 µg/L. That data is also the basis for communications between school staff, governing board members and concerned parents in effort to make informed decisions relative to future infrastructure improvements.

A6 Project/Task Description and Schedule

1. Project Objective

The objectives of this project are to: 1) reduce childhood exposure to lead by identifying drinking water sources in schools and child care facilities in Nebraska, 2) foster relationships with community partners to decrease childhood exposure to lead in drinking water and, 3) increase public education regarding exposure to, and the adverse health effects associated with, exposure to lead in drinking water.

The generation of data to fulfill the needs of this project requires that the collection of samples follow established written protocols and that all analytical procedures are to be conducted by trained personnel using properly calibrated equipment and following U.S. EPA approved laboratory protocols.

It is a primary objective that this QAPP effectively coordinate the associated activities of the Drinking Water Division, sample collector/sample collection team, local project coordinator, and the NPHEL to ensure quality collection and analysis of water samples to meet the project goals.

Currently identified are 543 public elementary schools and 1,163 non-family home child care and pre-school facilities in Nebraska. In addition, a total of 158 private/parochial elementary schools, 138 middle schools (public and private/parochial), 125 high schools (public and private/parochial), and 1,881 in-home child care facilities are included in the potential sample pool. An estimated 71.3% of the in-home child care facilities were

constructed prior to 1988. Schools and child care facilities electing to participate in this project are prioritized by NDEE/NDHHS to determine most at risk. The criteria for prioritization includes:

- a. Age of child (six years of age or less)
- b. Socioeconomic status (schools with greater than 50% of students receiving free or reduced meals)
- c. Facility age (built before 1988)

Due to project participation being voluntary, 100% participation by criteria eligible schools and child care facilities may not occur. There is no pre-determined target number of schools and facilities that is needed for success of this project, nor is there a limit on those who can participate. The participating numbers may be fluid during the project period as schools and facilities may decide to participate or decline participation later during the project period.

2. Description of Work Performed

Through contract, participating local health departments (local project coordinators) and the Drinking Water Division will work together to facilitate local awareness and project participation from Nebraska schools and child care facilities. Those schools and child care facilities electing to participate in this voluntary project are prioritized by NDEE/DHHS based on the children most at risk to lead exposure. Prior to sample collection, a search of the school or facility plumbing profile records if available, and a walk-through is performed by staff of the school or daycare facility, with assistance as needed from representatives of the local health department and/or contractors, to identify water outlets used for drinking and food preparation. Sites identified for sample collection during the walk-through are recorded by location, type and other relevant characteristics on a sample site list for that facility. That list constitutes the sampling plan for the school or child care facility. Procedures for performing the facility walk-through are located in Module 4: Developing a Sampling Plan, located in *3Ts for Reducing Lead in Drinking Water in Schools and Child Care Facilities*, included as Attachment A to this document.

Prior to collecting samples, training of local health department, school, and child care facility staff on proper water sample collection using USEPA protocols is conducted, including adherence to the established quality assurance plan. Training includes use of a sampling protocol video and Power Point presentation developed specifically for this project. The video and Power Point presentation of the required sample collection protocol for this project is derived from Module 5: Conducting Sampling and Interpreting Results, located in *3Ts for Reducing Lead in Drinking Water in Schools and Child Care Facilities*, included as Attachment A to this document. Follow-up flush samples are not included as part of this project.

Drinking water samples are collected by the sample collector or sample collection team as first draw (initial) samples, from sites indicated on the sampling plan. These sites are drinking water outlets including water fountains (bubblers), food preparation outlets (located in the cafeteria, kitchen, and home economics classrooms) and other outlets where there is the possibility of drinking the water such as in special education

classrooms, the medical office, the teachers' lounge, and ice machines. The sampling plan provides more detail on the identified sampling locations. At each qualifying school, samples are collected from no more than 15 water outlets, and samples are collected from no more than 3 water outlets at each qualifying non-family home child care facility. Samples from in-home child care facilities are collected from no more than 2 water outlets. If project funding allows, additional samples at schools and child care facilities will be collected and analyzed. Sampling for this project consists of collecting one 250-liter first draw water sample after an 8 – 18 hour stagnation period and before the facility is open, from drinking water and food preparation faucets at the facility. If a lead level result is greater than 15 µg/L at any water outlet used for drinking water or food preparation, a facility may request a second sample for confirmation purposes.

The collected water samples are to be mailed or otherwise transported to the NPHEL for analysis of lead using EPA Method 200.8. When analysis is completed, results of sample analysis are reported electronically to the designated school or child care facility, and the Drinking Water Division.

The local health departments distribute to parents, school and childcare staff, educational materials developed for this project that communicate health risks of lead exposure, and to ensure that those in the care of children are aware of methods to reduce lead exposure.

This project, including laboratory analysis, is scheduled for a three-year period; October 1, 2019 – September 30, 2022. Summarized timeframe for project activities is included as Attachment F to this document.

3. Project Reports

- a. NPHEL
 - i. All NPHEL reporting criteria may be viewed in Section 8.4 of the NPHEL QAP.
- b. DW
 - i. Drinking Water Division staff will prepare a public data summary report. Reports of the lead sampling results from schools or child care facilities participating in the project are generated periodically during the three-year project period. Report elements include: the number and type of qualified participants in this sampling project, the number of qualified participants identified that have elevated lead levels (>15 µg/L).
- c. Local Health Departments (Local Project Coordinators)
 - i. Participating local health departments compile a report at completion of the three-year project, and submit to the Drinking Water Division within 30 days after completion of the project. Report elements include the number and type of qualified project participants within the health department district, the total number of samples collected at each qualified facility, and the location within the facility where the samples containing elevated lead levels were collected.

A7 Quality Objectives and Criteria for Measurements Data

1. Objective

The data quality objective for this project is to provide analytical results of known and documented quality, for lead in water samples collected from schools and child care facilities participating in the project.

During this project, two possible decision errors can occur due to poor data quality; false positive or false negative. A decision based on a false positive can impose an undue level of concern to parents and facility staff if a high level of lead is reported but is in error. A decision based on a false negative error can result in failing to take action to protect children from unacceptable levels of lead in drinking water.

2. Data Quality Indications

The data quality indicators that will be used to interpret the acceptability of the data for this project include:

- a. Accuracy and Precision – water samples collected from participating schools and child care facilities for purposes of this project are analyzed by the NPHEL, a U.S. EPA certified laboratory. That certification includes analytes referenced in EPA Method 200.8 and requires the NPHEL to maintain certain accuracy and precision requirements. These limits are acceptable to the project and constitute adequate accuracy and precision for this project.
- b. Representativeness – Locations for collection of water samples for the analysis of lead in participating schools or child care facilities, are as prescribed to meet the objectives of this project. The sampling effort is designed to identify water outlets used for consumption and food preparation that may require corrective action due to first draw sample results that exceed 15 µg/L of lead.
- c. Comparability - This is addressed by the collection, prescribed analytical techniques, and reporting of data as described in this document. Use of EPA Method 200.8 Rev. 5.4 allows for the comparison of data to U.S. EPA's drinking water action level for lead of greater than 15 µg/L.
- d. Completeness - This project requires an error rate of $\geq 99\%$ for all analytical results to effectively use the data for decisions associated with this project. One hundred percent (100%) of collected and verified samples will be analyzed and reported. A variety of circumstances (i.e. no access to the sample site, water outlet temporarily out of service, etc.) may prohibit the collection of scheduled samples or invalidate samples (i.e. sample containers damaged in transit, sample holding times exceeded, etc.). If the completeness goal is not met, resampling will be conducted as allowed by project budget constraints and project timeframe.

A8 Special Training/Certification

1. NPHEL

All NPHEL training and certification criteria can be found in Section 3 of the PHEL QAP.

2. Sample Collectors

Individuals collecting samples for this project are staff from school districts, child care facilities, local health departments, and/or contractors. If the participating facility is a PWS, the sample collector is the licensed water operator that holds a minimum of a Grade IV water operator license. Special training/certification for licensed water operators is described in Section A8-2 and Section A8-3 of the Nebraska PWSS QAPP, included as Attachment C to this document.

3. Water Sample Collection Training

Training the water sample collectors for this project consists of viewing the Drinking Water Division developed video and/or Power Point presentation prior to the sample collection. In addition, local project coordinators will ensure through documentation that sample collectors have completed the required training to effectively accomplish the water sample collection requirements of this project. Documentation will be maintained by the local project coordinators and include name of sample collector and date that the sample collection training was completed.

A9 Documents and Records

1. Documentation

Information pertinent to NPHEL documentation of water samples collected for this project can be found in Sections 7 and 17 of the NPHEL QAP. Computer data entry of sample and analytical test result information are as specified in the approved NPHEL protocols. Documentation of training received by sample collectors, as stipulated in A8.2 and A8.3 of this QAPP is obtained by local project coordinators and/or DW personnel through the progression of the three-year project. This QA Project Plan, and any revisions, will be maintained and distributed electronically or in paper format to those on the distribution list by the Project QA Manager.

2. Records

Information pertinent to NPHEL recordkeeping of water sample results associated with this project can be found in Section 8.5 of the NPHEL QAP.

Water sample data for this project is electronically entered into a designated database for the DW retrieval and is retained in an electronic format for the length of time designated by DHHS Records Management. Schools or child care facilities participating in the project must maintain the sampling plan, as described in A6.2 of this QAPP, and the lead analytical results received from NPHEL until conclusion of the three-year project. Local project coordinators (local health departments) and/or DW personnel will maintain the documentation of training received by sample collectors, as stipulated in A8.2 and A8.3 of this QAPP, until conclusion of the three-year project.

Data Acquisition

B1 Sampling Process Design

1. Sampling Process Design

All measurements to determine lead concentration in the qualified facilities' drinking and food prep water outlets are classified as critical, meaning that samples with results above the U.S. EPA drinking water lead action level of 15 µg/L may indicate a public health issue. Other specific ways in which the Drinking Water Program's final data are used include those for critical and informational purposes by other data users identified in A4.3 and A4.4 of this QAPP.

2. Sampling Process

The sample pool consists of schools and child care facilities prioritized by NDEE/NDHHS to determine where children are most at risk. The criteria for prioritization are,

- a. Age of child - children 6 years of age or less are most vulnerable to the adverse effects of lead exposure, a neurotoxin that negatively impacts the developing nervous system.
- b. Socioeconomic status - areas in a community where 50% of school students receive free and reduced school meals.
- c. Facility age - buildings constructed before 1988 are more likely to contain plumbing components that containing lead.

There are 543 public elementary schools in Nebraska, with 46% of students on reduced or free meal programs. There are 1,163 non-family home child care and pre-school facilities in Nebraska, serving 103,594 children. In addition, a total of 158 private/parochial elementary schools, 138 middle schools (public and private/parochial), 125 high schools (public and private/parochial), and 1,881 in-home child care facilities are included in the potential sample pool. An estimated 71.3% of the in-home child care facilities were constructed prior to 1988. At each qualifying school, samples are collected from no more than 15 water outlets, and samples are collected from no more than 3 water outlets at each qualifying non-family home child care facility. Samples from in-home child care facilities are collected from no more than 2 water outlets. If project funding allows, additional samples from water outlets at schools and child care facilities will be collected.

For this project, the Drinking Water Division contract with local health departments (local project coordinators) to facilitate awareness and encourage participation in the project from schools and child care facilities located within the respective local health department districts. Sample collection protocol for this project is located in Module 5: Conducting Sampling and Interpreting Results, of *3Ts for Reducing Lead in Drinking Water in Schools and Child Care Facilities*, included as Attachment A to this document. Follow-up flush samples are not included as part of this project.

The participating facilities contact the local project coordinators to request sample containers. The local project coordinator forwards the request to NPHEL for scheduling and mailing of water sample containers to those participating facilities. Collection of the

water sample at the sites identified on the facility sampling plan is performed by the facility representative previously trained in the protocol as described in Section A8.2 and A8.3 of this QAPP. The collected samples are mailed to the laboratory, or by other appropriate transport, within the prescribed holding time.

3. Type, Frequency and Locations of Samples

Samples are collected for the determination of lead concentration in water outlets used for drinking and food preparation. Coordination between DW personnel, PHEL personnel, and local project coordinator determine the number and frequency of sample collection from the qualified sample pool. Locations of sample collection are identified in the sampling plan for the school and child care facility. If a sample location is inaccessible, and upon approval by the Project Manager, it will be rescheduled for sample collection.

B2 Sampling Methods Requirements

1. Procedures for Collecting Samples

Instructions on how to collect samples are included with sample containers that are sent out from NPHEL. The instructions correspond to sample protocol established in Module 5: Conducting Sampling and Interpreting Results, of *3Ts for Reducing Lead in Drinking Water in Schools and Child Care Facilities*, included as Attachment A to this document. The sample collector must follow proper collection technique and sampling protocol, and be documented as having received required training as stipulated in Section A8.2 and A8.3 of this QAPP prior to collecting samples for this project. Within two weeks after collection, samples are transported to NPHEL by common carriers, such as the U.S. Postal Service or the United Parcel Service, or may be hand delivered. Samples received by NPHEL outside of that two-week time limit will be rejected.

2. Equipment and Methods

For this project, NPHEL analysis for lead is by EPA Method 200.8. Rev. 5.4. Information pertinent to NPHEL methods and equipment may be found in the attached NPHEL QAP. Acid, when used as a preservative, is added to the sample upon receipt of the sample at the laboratory. The Table below identifies analysis method, sample container type, preservation, and holding time for samples collected for this project.

Analyte	Method	Container Type & Volume Required	Preservation	Holding Time	Action Level
Lead	EPA Method 200.8 Rev. 5.4	Clean 250 ml plastic wide-mouth	Preserved in lab, HNO ₃ < 2	6 Months	15 µg/L

3. Receipt of Samples

NPHEL policies and procedures regarding receipt and handling of samples may be found in Section 7 of the attached NPHEL QAP.

B3 Sample Handling and Custody Requirements

1. Ordering Samples

Coordination between DW personnel, NPHEL personnel, local project coordinators, and participating schools and child care facilities determine the number and frequency of sample collection from the qualified sample pool throughout the project time period. Requests for sample containers from qualified participants and local project coordinators will be sent to the NPHEL electronically, or other appropriate means as determined by NPHEL, not more frequently than once per week, and in a format that is acceptable to both DW and NPHEL.

2. Custody

NPHEL policies and procedures regarding sample custody may be found in Section 7 of the NPHEL QAP.

3. Sample Disposal

NPHEL policies and procedures relevant to sample disposal may be found in Section 7.8 of the NPHEL QAP.

B4 Analytical Methods

1. Method Selection

For this project, NPHEL analysis for lead is EPA Method 200.8. Rev. 5.4. Information relevant to approved analytical methodologies and proper method selection for sample analysis may be found in Sections 8 and 14 of the NPHEL QAP. For the purposes of this project, the Table below summarizes the main analytical requirements. The NPHEL Standard Operating Procedure (SOP) for performance of this method is included as Attachment G to this document.

For analysis of lead in drinking water by NEPHL with the method specified, target turnaround time for results is 21 days. Due to the nature of the sample pool and sample scheduling, and with acceptance by the Project Manager, some deviation from that target is allowable and will have no impact on the overall project.

Analyte	Report Level	Method	Turnaround Time
Lead	0.5 µg/L	EPA Method 200.8 Rev. 5.4	21 Days

2. Corrective Action

Information relevant to NPHEL corrective actions regarding sample analysis may be found in Section 16 of the NPHEL QAP.

B5 Quality Control

Information pertinent to laboratory quality control may be found in Section 11 of the NPHEL QAP.

1. Sampling (Field) Quality Control Checks

Sampling quality control checks are not included as part of this project.

2. Analytical Quality Control Checks

Information pertinent to NPHEL analytical quality control checks may be found in the NPHEL QAP.

B6 Instrument/Equipment Testing, Inspection and Maintenance

1. Laboratory Equipment

Information pertinent to NPHEL equipment testing, inspection and maintenance may be found in Section 10 of the NPHEL QAP.

B7 Calibration Procedures and Frequencies

1. NPHEL Instruments and Equipment

Information relevant to NPHEL instrument and equipment calibration requirements may be found in Section 10 of the NPHEL QAP.

B8 Inspection/Acceptance of Supplies and Consumables

1. NPHEL Supplies

Information relevant to NPHEL supplies may be found in Section 10 of the NPHEL QAP.

B9 Non-Direct Measurements

Non-direct measurements refer to data obtained for use in this project from existing data sources, not directly measured or generated in the scope of this project. Examples of this type of data include data obtained from existing sources or databases (either from within or outside the DW) and data obtained by others and offered or presented to the DW for use. Sources of non-direct measurements include routine lead samples collected and analyzed for PWS compliance purposes located within the Nebraska Safe Drinking Water Information System (SDWIS) database. Other non-direct data generated may be from lead samples collected and analyzed in accordance with U.S. EPA approved methodologies and meeting the data quality objectives of this project.

For this project, use of non-direct measurements, is limited to data irregularity confirmation purposes during data review and verification. Suitability of non-direct measurements for confirmation procedures and as an indicator of potential public health risk varies with the quality of the non-direct measurement data and the situation. Non-direct measurements must be confirmed as validated and verifiable data prior to use for support of any decisions associated with this project. Validated and verified data direct the decisions made with respect to this project, and support the needs of principal and secondary data users.

B10 Data Management

1. Data Flow

For this project, data will be produced at the NPHEL. The NPHEL data is transferred electronically from the Laboratory Information Management System (LIMS) to the Drinking Water Division.

Local project coordinators identify the qualified schools and child care facilities for lead analyses to be conducted verifying the requesting facility's qualification based on the prioritization established for this project. Prioritization criteria is in Section B1.2 of this QAPP. If qualified, the request is sent electronically, or by other means, to NPHEL to ship the appropriate test kit, which includes the sample container, sample collection and return instructions, and a sample submission form that is to be completed by the sample collector. Samples collected for this project and subsequently received at the NPHEL are logged in, sample demographics entered, analyzed within established U.S. EPA holding times. The results are reported electronically to the schools and child care facilities (sample submitter), and the Drinking Water Division. On at least a weekly basis, the DW program will query LIMS directly to retrieve results and then provide each health department the current sample results for schools and child care facilities located in their jurisdiction.

Distribution of data to secondary data users will be accomplished as requested or required.

Data flow for this project is summarized and included as Attachment H to this document.

2. Data Tracking and Storage

NPHEL data tracking and storage are addressed in Section 8 of the NPHEL QAP. All of the completed data for this project can be queried daily from LIMS by the Drinking Water Division where it is retained for the time specified by the project requirements. NPHEL data back-up is addressed in Section 5.1 of the NPHEL QAP. The data format established for this project is based on the need for reporting and retrieval purposes to meet the objectives of this project. The hardware and software configurations used currently for the various reporting and retrieval processes associated with the PWSS Program is used for this project, and is acceptable for reporting and retrieval processes associated with this project.

Data in the form of a report is generated from the established data format by DW personnel on a periodic basis as determined by the project requirements. Data is reviewed by the primary project personnel to determine lead levels above the U.S. EPA drinking water lead action level of 15 µg/L in sample sites of schools or child care facilities participating in this project. Electronic data retrieved and generated reports for this project are backed-up daily through processes instituted by the DHHS Information Systems and Technology Unit. The laboratory submission form and sampling instructions used for this project are included as Attachment I to this document.

Assessments

C1 Assessments and Response Actions

1. Assessments

Field audits by DW personnel may be conducted for this project. However, identification of problems related to technical performance will be the responsibility of the staff working on this project. DW personnel assigned to this project will assess any problem that arises in the field. If necessary, modifications to technical procedures may be considered. Any changes in technical procedures will be documented, and evaluated by DW personnel to determine if there will be any impact to the data.

NPHEL personnel will perform self-audits and institute corrective actions in accordance with their respective written procedures.

- a. Systems Audits
 - i. Systems audits are qualitative reviews of project activity conducted annually under the direction and in the presence of the QAPP Manager to ensure that the overall quality assurance program is functioning adequately and the appropriate quality control measures are being implemented. This includes internal system reviews and/or performance audits of the NPHEL as well as activities associated with this project.
- b. Internal Performance Audits
 - i. Information relevant to NPHEL internal performance audits may be found in Section 15 of the NPHEL QAP.
- c. External Performance Audits
 - i. Information relevant to external audits of NPHEL activities may be found in Section 15 of the NPHEL QAP.

2. Corrections

For purposes of this project, information relevant to NPHEL corrections may be found in Section 16 of the NPHEL QAP.

- a. Responsibility to Initiate Corrections
Information relative to initiating NPHEL corrective actions is found in the NPHEL QAP.
 - b. Responsibility for Corrective Actions
Information relative to taking NPHEL corrective actions is found in the NPHEL QAP.
- ### 3. Other Corrective Actions
- a. M&C Program personnel evaluate data received daily from the NPHEL to identify inconsistencies in data associated with this project. If inconsistencies appear, the M&C Program Manager is notified and that data is compared to historic data if available, and other resources as appropriate.

C2 Reports to Management

1. NPHEL

For the purposes of this project, information pertinent to NPHEL reports and reporting requirements may be found in Section 2 of the NPHEL QAP.

a. Coordination Meetings

- i. The NPHEL Quality Assurance Manager will, as needed or requested, schedule quality assurance meetings between DW personnel and NPHEL personnel to discuss issues that arise relating to water quality monitoring requirements. The NPHEL Quality Assurance Manager is responsible for preparing and distributing a written summary of these meetings to participating attendees.

b. Quality Assurance Reports to Project Management

- i. Information relative to NPHEL quality assurance reports may be found in the NPHEL QAP.

2. DW

For the purposes of this project, reports will be prepared and distributed as outlined in the table below:

Actions	Dates
The Project QA Manager will prepare and submit a quality assurance program status report to the Project Manager.	June 1, Yearly
The Project QA Manager will periodically review the QAPP with input from other participants involved in the project and recommends changes to the Project Manager.	On-going
If/as needed, the Project QA Manager will submit to U.S. EPA and Nebraska DEE QAPP Manager for approval, QAPP revisions that significantly impact the technical and quality objectives of the project.	On-going
The Project QA Manager will submit to the Project Manager reports of participation in sample performance or system audits.	On-going
The Drinking Water Division Administrator will prepare and submit an interim public data summary project report to all authorized parties. Report is to include assessment results, project outputs, and outcomes derived from schools and child care facilities participating in this sampling project.	March 31, 2021 and 2022
The Drinking Water Division Administrator will prepare and submit a final public data summary project report to all authorized parties. Report is to include assessment results, project outputs, outcomes, and conclusions derived from pre-schools, public elementary schools, and non-family home child care facilities participating in this sampling project.	October 31, 2021

The Project QA Manager will prepare and submit to the Project Manager a final summary report of the project plan accomplishments and deficiencies.	October 31, 2022
The Drinking Water Division Administrator will prepare and submit a final public data summary project report to all authorized parties. Report is to include assessment results, project outputs, outcomes, and conclusions derived from private/parochial elementary schools, in-home child care facilities, and public/private/parochial middle and high schools participating in this sampling project.	October 31, 2022

Review, Evaluation of Usability, and Reporting Requirements

D1 Data Review, Verification and Validation

1. NPHEL

For the purposes of this project, information relevant to NPHEL data review, verification and validation activities are found in Section 8.3 of the NPHEL QAP.

2. DW

For the purposes of this project, M&C Program personnel will review weekly information transferred from LIMS to DW Division. This data is composed of lead analytical results collected from qualified schools or child care facilities participating in this project. M&C Program personnel review the data to determine sample results that exceed 15 µg/L of lead in drinking water outlets. When apparent irregularities/inconsistencies are identified (incorrect sample location, incorrect sampler, insufficient sample volume, a non-prioritized school that submits samples for this project), the M&C Program Manager will be notified to determine if there is need for corrective actions.

D2 Verification and Validation Methods

1. NPHEL Methods

For purposes of this project, information relative to NPHEL verification and validation methods are found in Section 11 of the NPHEL QAP.

2. DW Methods

For the purposes of this project, M&C Program personnel review the project data for LIMS inaccuracies and inconsistencies. Irregularities identified on the data reported daily are referenced to the appropriate DW Division personnel for confirmation. When an analytical result is suspiciously high or low, it will be examined to determine if it must be discarded to avoid bias in the data set. A suspiciously high or low analytical result appears to deviate markedly from other observed analytical results in the group of samples collected from the school or facility. Results from a single sample collected from a school or facility will not be scrutinized for abnormality. The program will follow-up to

see if there was a reason that location has a higher or lower result than the group. Comparability of data can be initiated using historical data if available, statistically tested to see if the value is an outlier, and/or other course of action as the M&C Program Manager determines appropriate. Other actions include contact with the local project coordinator and/or sample collector to identify any irregularities observed during the sample collection process that may have contributed to lower or higher analytical results. Identification, if possible, of a sample location error or sampling technique error will invalidate that data in question. If verified as an error in the sample collection process, and upon approval by the Project Manager, a replacement sample for confirmation purposes may be requested by the local project coordinator. Standardized sampling protocol and analytical techniques with similar reporting limits help ensure comparability.

D3 Reconciliation with User Requirements

Although this project requires the use of data for non-regulatory reporting purposes, only valid and defensible data will be reported to clients. This QAPP is intended to reference, describe and explain an integrated system of management activities involving planning, implementation, assessment, reporting and quality improvement to ensure that processes, items and services covered herein are of the type and quality needed and expected by DW to meet the objectives of this project. The project use of sound science-based analytical methodologies and laboratory quality assurance provides reliable and meaningful data without which, decisions on corrective actions in response to elevated lead levels in the drinking water outlets of a school or child care facility could not be derived.

If the data quality indicators do not meet the project's requirements as outlined in this QAPP, the data may be discarded and re-sampling may occur. Such an occurrence may delay corrective actions for elevated lead levels in the drinking water outlets where warranted.

Due to variables associated with source water quality and construction aspects of the schools and facilities from which samples are collected, and limited historic data, an expected range of sample results cannot be reliably determined for this project. M&C Program personnel as determined qualified by the M&C Program Manager, will review and identify by observation, possible outliers within a group of samples collected from a specific school or facility. Possible outliers are sample results that are noticeably outside the normal distribution of sample results collected from the school or facility. The M&C Program Manager will decide on any corrective action needed for outliers. If data does not meet the data quality objectives of this project due to unsatisfactory sample collection procedures, sample location, or laboratory errors resampling will be accomplished as the project timeframe and budget allow. Any corrective action made for outliers will be documented and included in any data package when requested by data users.

M&C Program personnel will perform two statistical analyses to determine percent completion of the project. First is calculated by comparison of the number of participating schools and child care facilities to the total number of identified eligible schools and child care facilities.

Second is calculated by comparison of the number of participating schools and child care that have submitted samples and received valid sample results, to the total number of participating schools and child care facilities. Results obtained from these two analyses will be evaluated, at least monthly, by the Project Manager and reconciled with the expected outputs.

If NPHEL equipment failure negates the ability to perform a particular method or test for a certain analyte, the NPHEL will contract that work out to other laboratories that meet the reporting limits, approved methodology, and maintain necessary laboratory certification for client purposes. This is addressed in Section 8.1 of the NPHEL QAP.

If the cause of the failure is identified as originating at the NPHEL, analysis, calibration and maintenance needs will be reassessed, as identified by the appropriate NPHEL personnel. This is addressed in Section 16 of the NPHEL QAP. If a problem is related to the sample collection process and protocols, retraining will be provided and protocols revised if needed.

The data obtained from this project will be analyzed to determine possible anomalies and/or departure from any assumptions made during the planning phase. M&C Program personnel will reconcile the results obtained from the project with the requirements defined by the data user. The M&C Program Manager will be consulted on the allowance of any data included in a report to data users, which did not fully comply with quality control criteria or QAPP requirements. The nature of the questionable data will be explained in data user reports, and any limitations on data use will also be discussed in the final project report.

REVISION HISTORY

Revision Number	Date	Description of Change
0	July, 2020	New document
1	September, 2020	A4, A5, A6, A7, A9, B1, B3, B10, D1, and D3: Expanded eligibility of participants in the sampling pool. A6 and A9: Project timeframe increased. A6 and B1: Estimated number in sampling pool changed. A6 and B1: Modified number of samples to be collected. C2: DW Reports to management updated. Attachments D, F and H: Updated.